YOR920000776US1 09/773,809 00280677aa
Amendment dated 10/20/2004 Reply to office action mailed 07/20/2004

The following is a complete listing of all claims in the application, with an indication of the status of each:

Listing of claims:

1   1. (currently amended) A method for making prioritized recommendations to
2   a customer in the process of filling a market basket for purchase on an Internet
3   commerce site, the method comprising the steps of:
4   generating by automated means a matrix of training data;
5   determining by automated means preferences for items not in said
6   market basket based on associative and renewal buying history from the
7   training data, said preference for each said item being determined by
8   separately determining a preference for renewal buying and combining said
9   separately determined preference for renewal buying with a separately
10   determined preference for associative buying, wherein said preference for
11   associative buying is dependent upon items in said market basket and said
12   preference for renewal buying is not dependent upon items in said market
13   basket ; and
14   making by automated means, and from said item preferences, a
15   prioritized recommendation of items so as to maximize the likelihood that the
16   customer will add to the market basket those items with higher priorities.

1   2. (canceled) The method of claim 1, wherein the two preferences are
2   estimated separately from the training data and combined in proper proportions
3   to obtain an overall preference for item not yet in the market basket.

1   3-8. (canceled)

1   9. (currently amended) A method for making prioritized recommendations to

2   a customer in the process of filling a market basket for purchase on an Internet

3   commerce site, the method comprising the steps of:

4   collecting by automated means statistics on preferences for associative

5   and renewal buying of items not in said market basket from training data;

6   precomputing by automated means model parameters for the probability

7   of a customer buying an item not in said market basket, said model parameters

8   being precomputed from the collected statistics and separately considering a

9   probability component for said associative buying and a probability component

10   for said renewal buying, wherein said probability for associative buying is

11   dependent upon items in said market basket and said probability for renewal

12   buying is not dependent upon items in said market basket ; and

13   automatically recommending for said customer a priority ordering of

14   items ~~for a given market basket~~ based on the precomputed model parameters

15   for a given market basket.

1   10. (previously presented) The method of claim 9, wherein the step of

2   collecting statistics comprises the steps of:

3   (a) for each item j, obtaining n_j a number of baskets with item j purchased;

4   (b) for each item j, obtaining n_j' a number of baskets with j being a sole

5   item purchased;

6   (c) for each pair of items i and j, obtaining a number of market baskets n_{ji}

7   with items j and i purchased together; and

8   (d) for each pair of items i and j, obtaining a number of market baskets n_{ji}'

9   with items i and j being the only two items purchased.

1   11. (currently amended) The method of claim 10, wherein the step of

2   precomputing model parameters comprises the steps of:

3   (a) computing $\mathbf{P}(\text{renewal}) = \dfrac{\sum_{k=1}^{m} n_k'}{\sum_{k=1}^{m} n_k}$;

4   (b) for each item j, computing $\mathbf{P}(j) = \dfrac{n_j}{\sum_{k=1}^{m} n_k}$;

5   (c) for each item j, computing $\mathbf{P}(\text{renewal} \mid j) = \dfrac{n_j'}{n_j} + \mathbf{P}(\text{renewal})\left(1 - \dfrac{n_j'}{n_j}\right)$;

6   (d) for each item j, computing

7       $\mathbf{P}'(j \mid \text{renewal}) = \mathbf{P}(\text{renewal} \mid j) \times \dfrac{\mathbf{P}(j)}{\mathbf{P}(\text{renewal})}$;

8   (e) for each pair of items i and j with $n_{ij} \neq 0$, computing $\mathbf{P}(j \mid i) = \dfrac{n_{ji}}{\sum_{k=1}^{m} n_{ki}}$

9   ;

10   (f) for each pair of items i and j with $n_{ij} \neq 0$, computing

11       $\mathbf{P}(\text{renewal} \mid j,i) = \dfrac{n_{ji}'}{n_{ji}} + \mathbf{P}(\text{renewal})\left(1 - \dfrac{n_{ji}'}{n_{ji}}\right)$; and

12   (g)   for each pair of items i and j with $n_{ij} \neq 0$, computing

13
$$\mathbf{P}'(j \mid \text{asso}, i) = \mathbf{P}(j \mid i) \times \frac{(1 - \mathbf{P}(\text{renewal} \mid j, i))}{(1 - \mathbf{P}(\text{renewal} \mid i))}.$$

1   12. (previously presented) The method of claim 11, wherein given a partial

2   basket $\mathbf{B} = \{i_1, i_2, \ldots, i_k\}$ and $\overline{\mathbf{B}}$ is a complementary set of items not in $\mathbf{B}$, the

3   step of recommending ordering for a given partial market basket comprises the

4   steps of:

5   (a)   if $\mathbf{B}$ is empty, sorting items in order of decreasing $\mathbf{P}(j \mid \text{renewal})$ and

6   returning this as an item preference ordering;

7   (b)   if $\mathbf{B}$ is non-empty, then

8   (i)   computing $\mathbf{P}(\text{renewal} \mid \mathbf{B}) = \min_{i_k \in \mathbf{B}} \mathbf{P}(\text{renewal} \mid i_k)$;

9   (ii)   compute a normalization factor $\sum_{k \in \overline{\mathbf{B}}} \mathbf{P}'(k \mid \text{renewal})$;

10   (iii)   for each item $j \in \overline{\mathbf{B}}$, computing

11
$$\mathbf{P}(j \mid \text{renewal}) = \frac{\mathbf{P}'(j \mid \text{renewal})}{\sum_{k \in \overline{\mathbf{B}}} \mathbf{P}'(k \mid \text{renewal})} ;$$

12   (iv)   computing a normalization factor $\sum_{k \in \overline{\mathbf{B}}} \mathbf{P}'(j \mid \text{asso}, \mathbf{B})$;

13   (v)   for each item $j \in \overline{\mathbf{B}}$, computing

14
$$\mathbf{P}'(j \mid \text{asso}, \mathbf{B}) = \max_{i_k \in \mathbf{B}} \mathbf{P}(j \mid \text{asso}, i_k) ;$$

15   (vi)   for each item $j \in \overline{\mathbf{B}}$, computing

16

$$P(j \mid asso, \mathbf{B}) = \frac{P'(j \mid asso, \mathbf{B})}{\sum_{k \in \overline{\mathbf{B}}} P'(k \mid asso, \mathbf{B})} \;;$$

17   (vii)   for each item $j \in \overline{\mathbf{B}}$, computing

18                 $P(j \mid \mathbf{B}) = P(j \mid asso, \mathbf{B})P(asso \mid \mathbf{B}) + P(j \mid renewal, \mathbf{B})P(renewal \mid \mathbf{B})$;

19   and

20   (viii) sorting items in order of decreasing $P(j \mid \mathbf{B})$ and returning this

21   as an item preference ordering.

1   13. (previously presented) The method of claim 12, wherein the step of

2   sorting comprises the step of using a final probability obtained for each item,

3      $P(j \mid \mathbf{B})$, of a customer buying the item to maximize profit by recommendation.

1   14. (previously presented) The method of claim 13, wherein the step of using

2   a final probability of an item to maximize profit comprises the steps of:

3   assigning a profit amount, $\$_j$, to each item;

4   computing $P(j \mid \mathbf{B})\$_j$ for each item; and

5   ranking recommendations based on the computation of $P(j \mid \mathbf{B})\$_j$ for

6   each item.